MODULE VI:

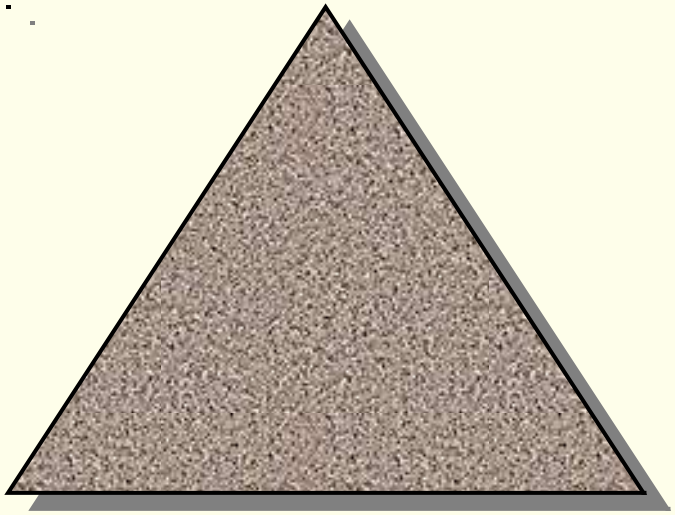
An Overview Of Mammography And Radiographic Evaluations

Goals of Breast Cancer Screening

- Detect disease early
- Interfere with natural course of disease
- Reduce mortality

Triad of Breast Cancer Detection

MAMMOGRAPHY



CLINICAL EXAM

SELF EXAM

Screening Mammography

- Performed on asymptomatic women
- Attempt to find unsuspected or clinically occult disease
- Separates women into two populations - those with normal findings and those with potential abnormalities
- Consists of two views of each breast

Screening Mammography

- Can detect occult breast cancer 2-3yrs before it becomes palpable
- Detects 90% of all 1 cm breast cancers
- False negative rate 8-10%
- PE and mammography together detect 98% of all 1cm cancers.

Screening Mammography in Women 40-49
Science, Economics & Politics

AMERICAN CANCER SOCIETY

META-ANALYSIS 1997: 8 RANDOMIZED TRIALS
LOOKING AT MORTALITY REDUCTION IN WOMEN 40-49

- 18% For the 8 trials
- 26% For the 7 population based trials
- 36% For the Malmo trial at 12yrs
- 44% For the Gothenberg trial at 12yrs

Screening Guidelines

- American Cancer Society and American College of Radiology recommend annual screening beginning at age 40

Indications for Early Screening

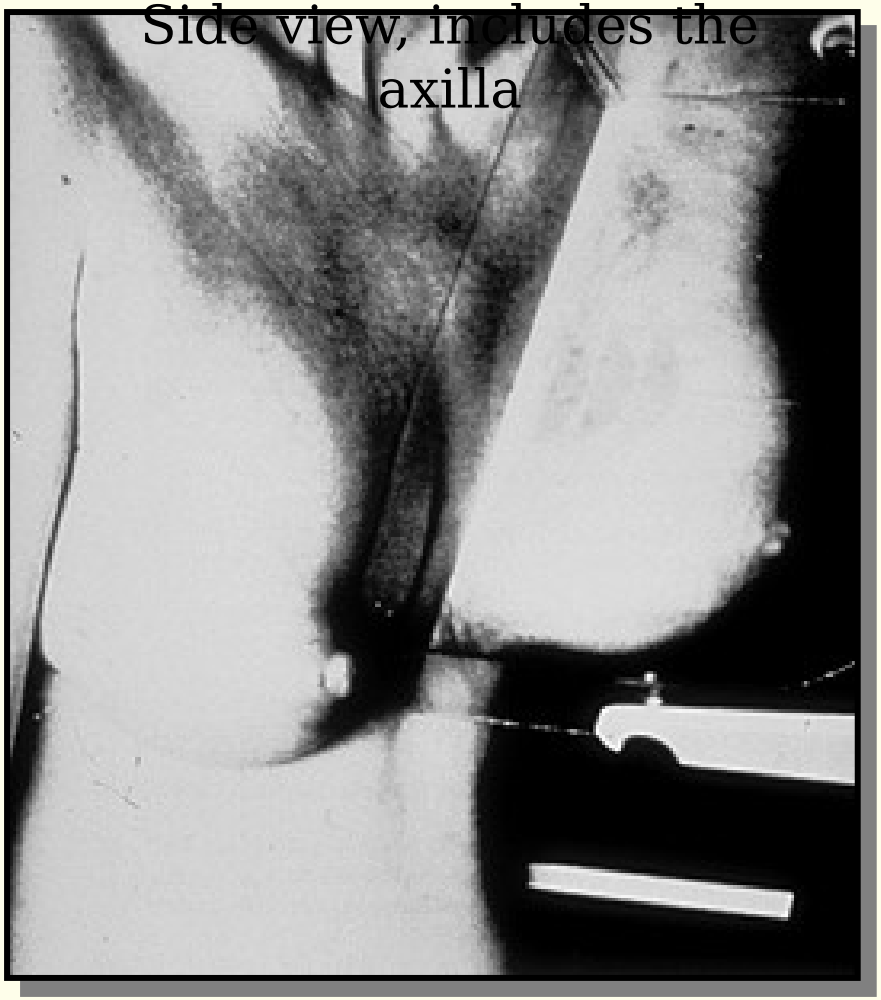
- Women with a previous breast cancer
- BRCA1 or BRCA2 gene positive
- Strong family history of premenopausal breast cancer
- Prior breast biopsy with high risk pathology
- Exposure to significant chest radiation at a young age (Hodgkin’s Disease)

Screening Mammographic Views

Craniocaudal (CC).....Head to toe

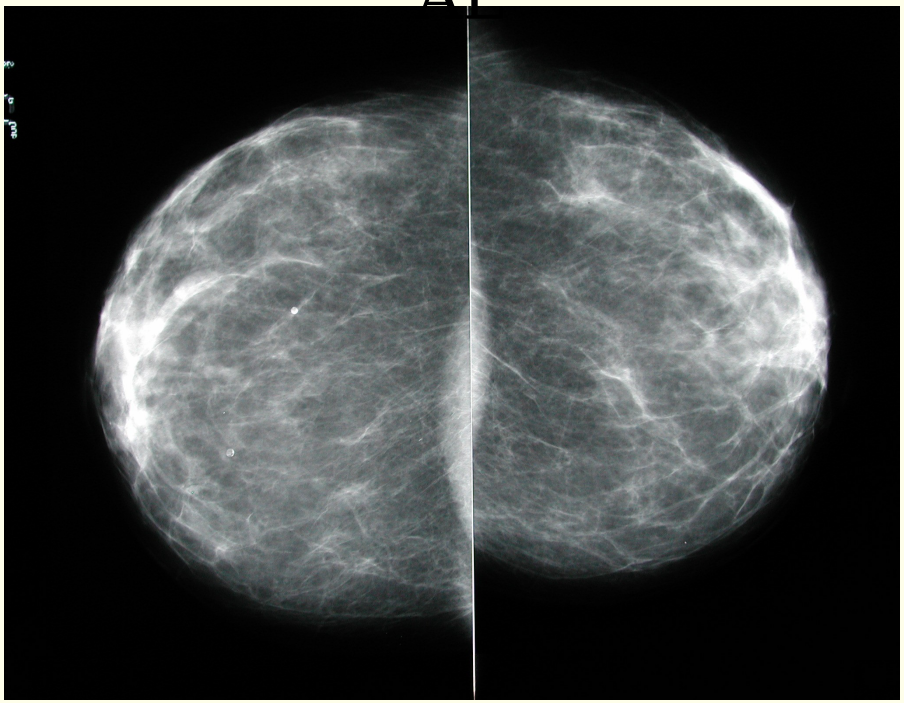
Medial-lateral oblique (MLO)

Side view, includes the axilla

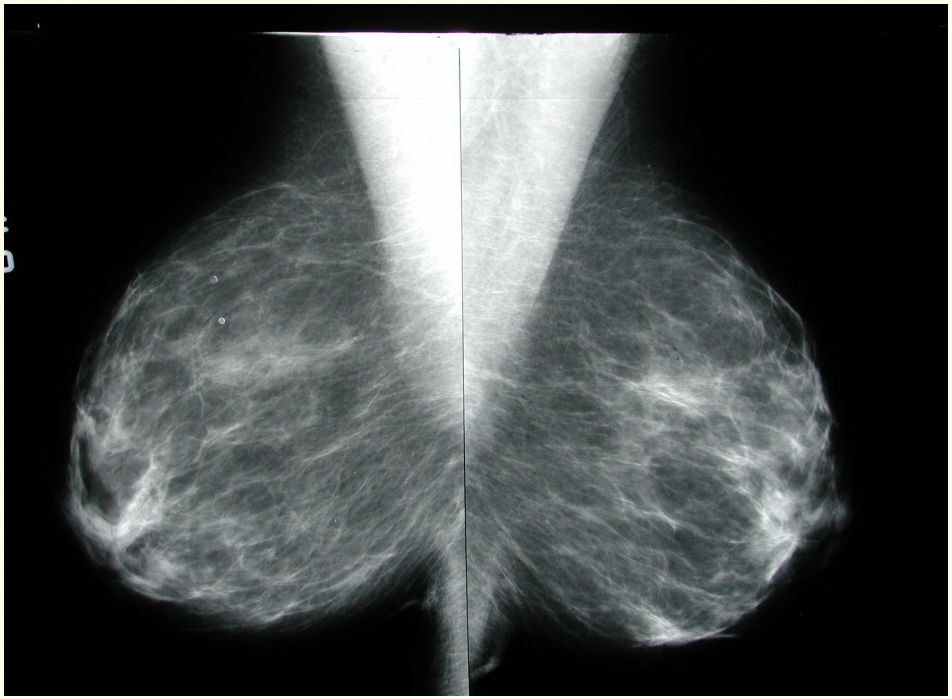


Mammographic Views, cont.

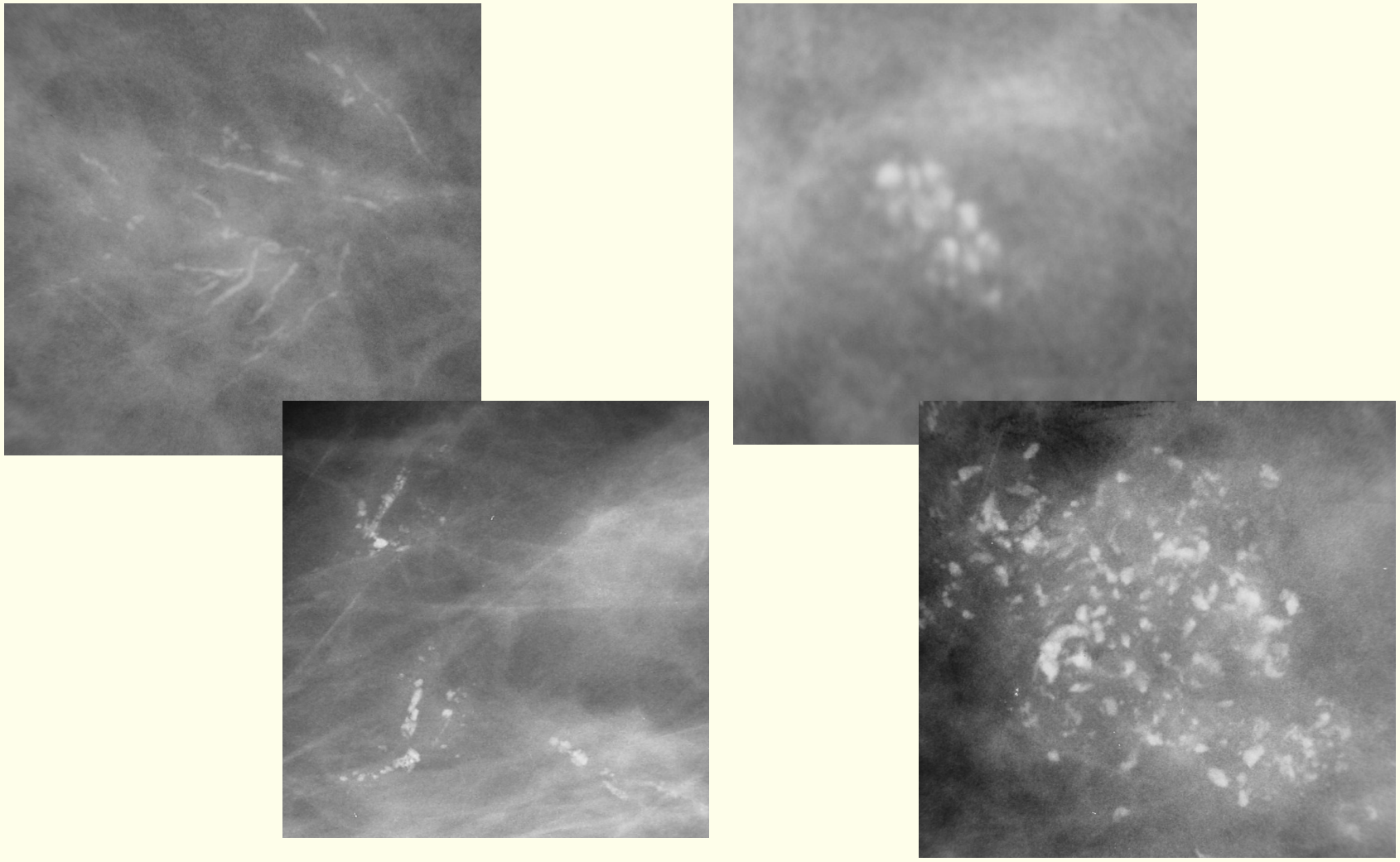
CRANIOCAUDAL



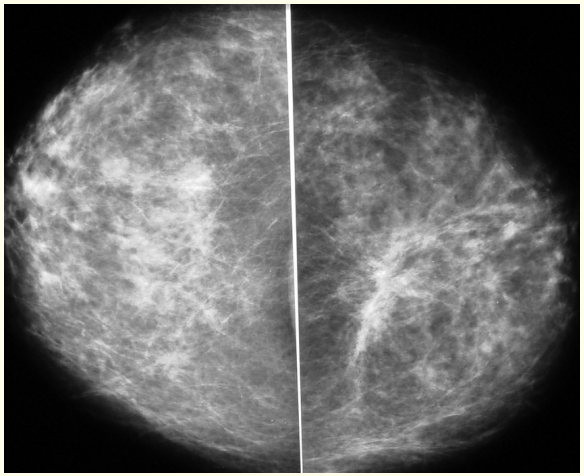
MLO

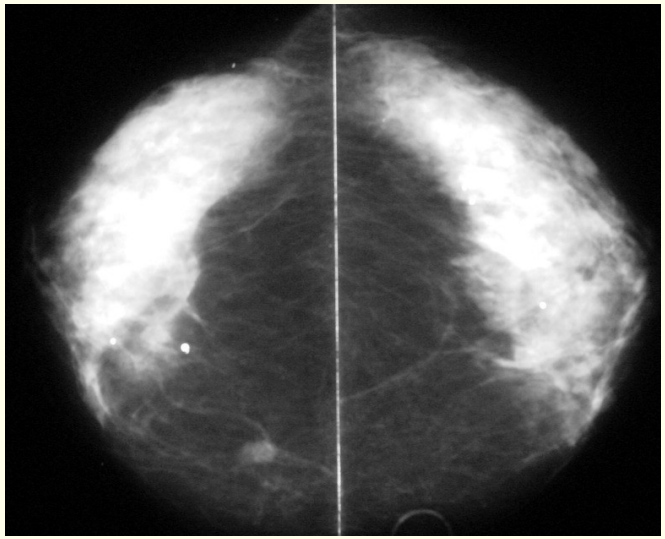
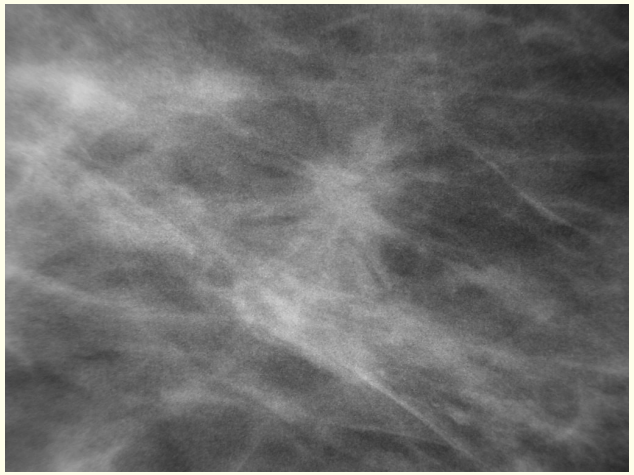
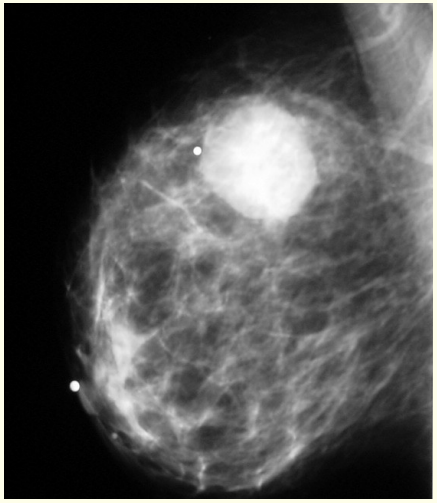
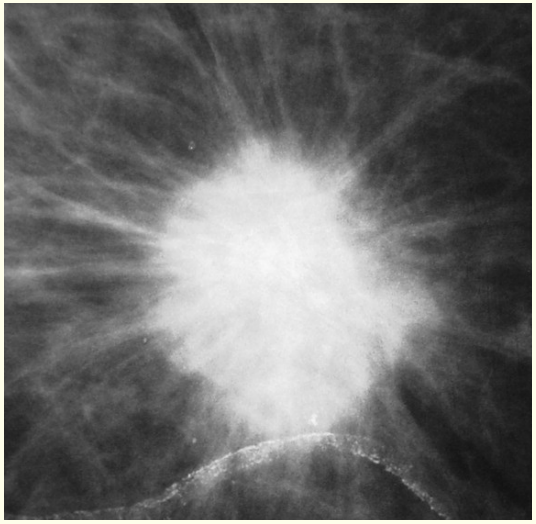


Microcalcifications – Ductal carcinoma in-situ



Mass – Invasive Carcinoma



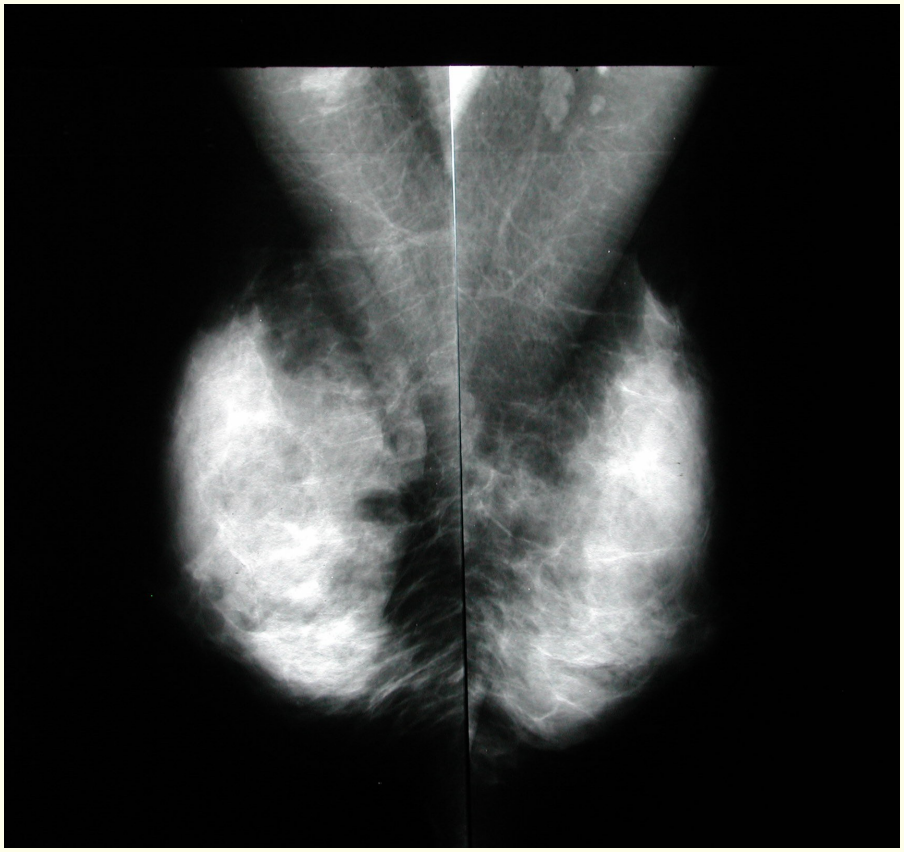
Screening Mammography Is there a Downside?

- DCIS over diagnosis?
- False Reassurance (false negative study)
- Anxiety (false positive study)
- Discomfort
- Radiation exposure?

False Negative Mammograms

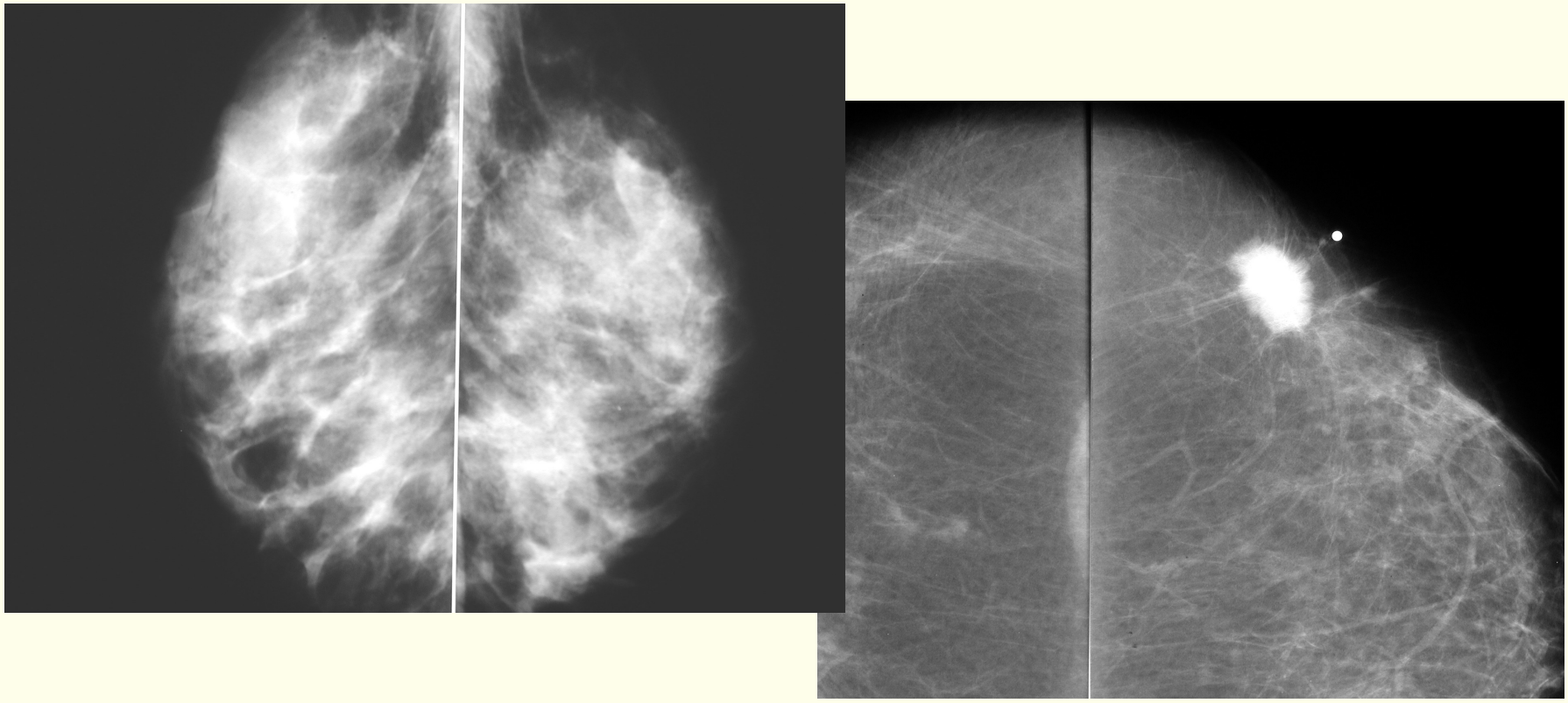
- Poor technique in positioning of the breast or exposure of the film
- Lesion not visualized against a dense background
- Film misinterpreted
- Overall false negative rate for cancer detection 8-10%

False Negative Mammograms, cont. Dense vs. Fatty

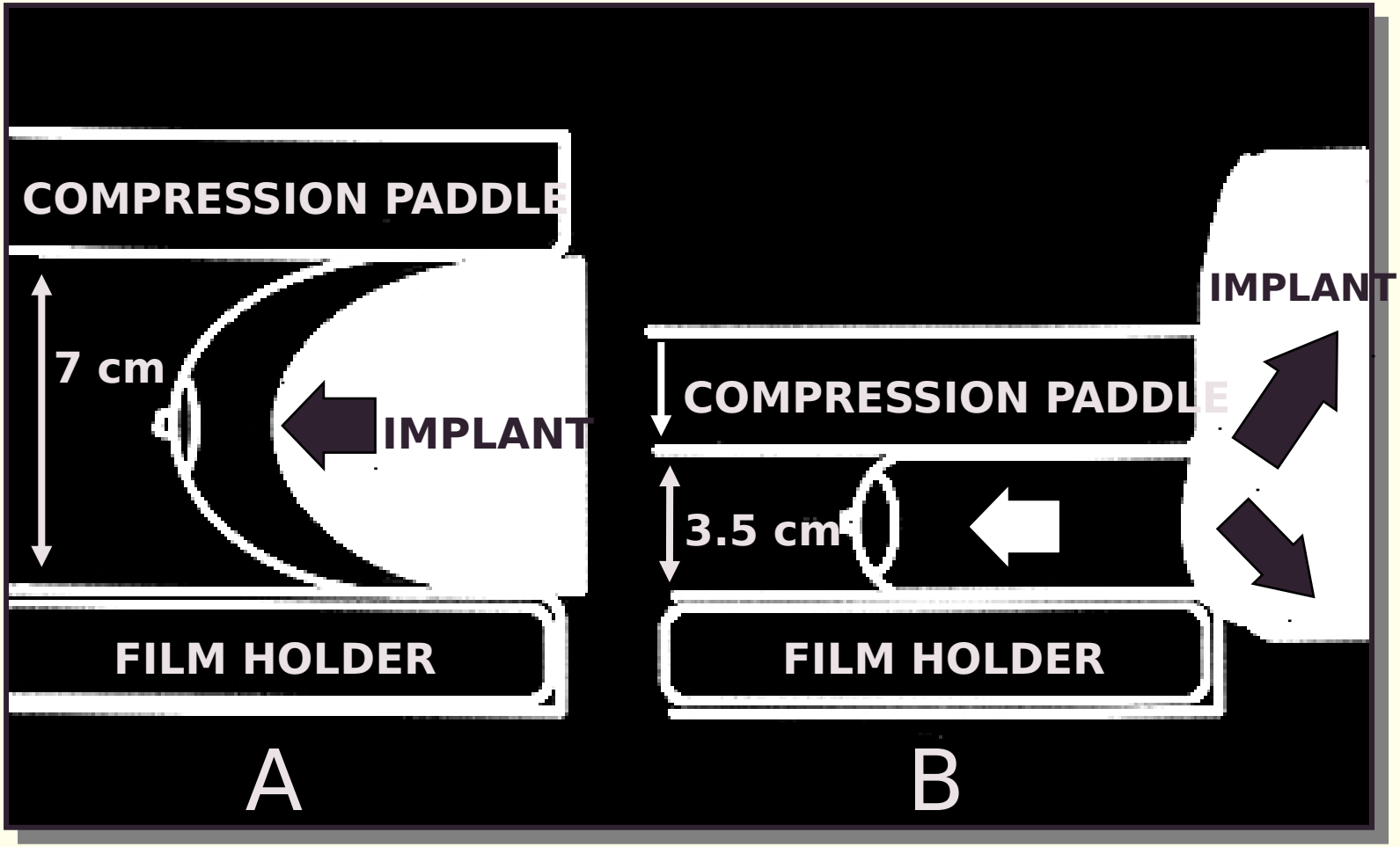


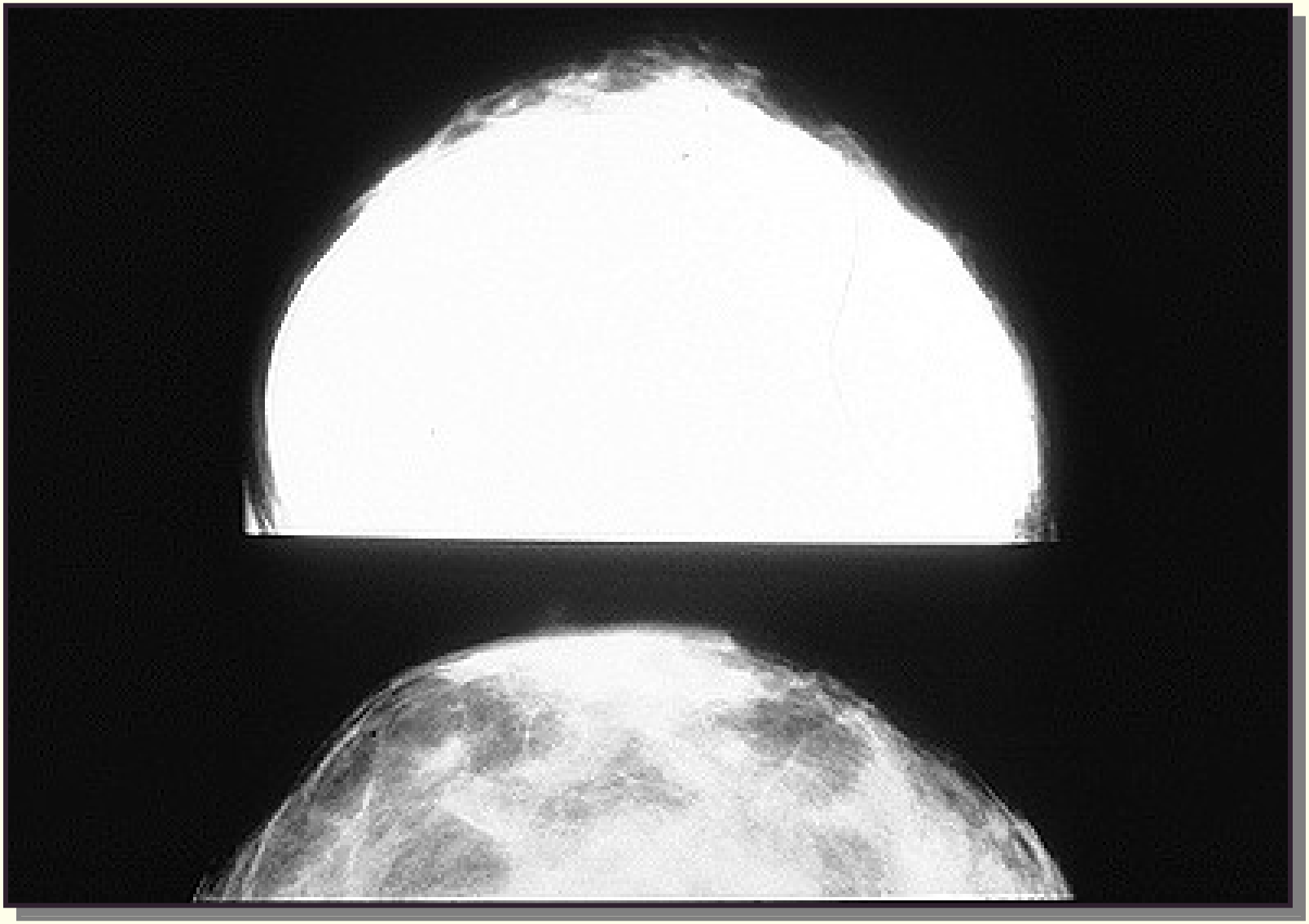
False Negative Mammograms, cont.

BREAST DENSITY AFFECTS THE SENSITIVITY OF MAMMOGRAPHY



Mammographic Technique for Women with Implants



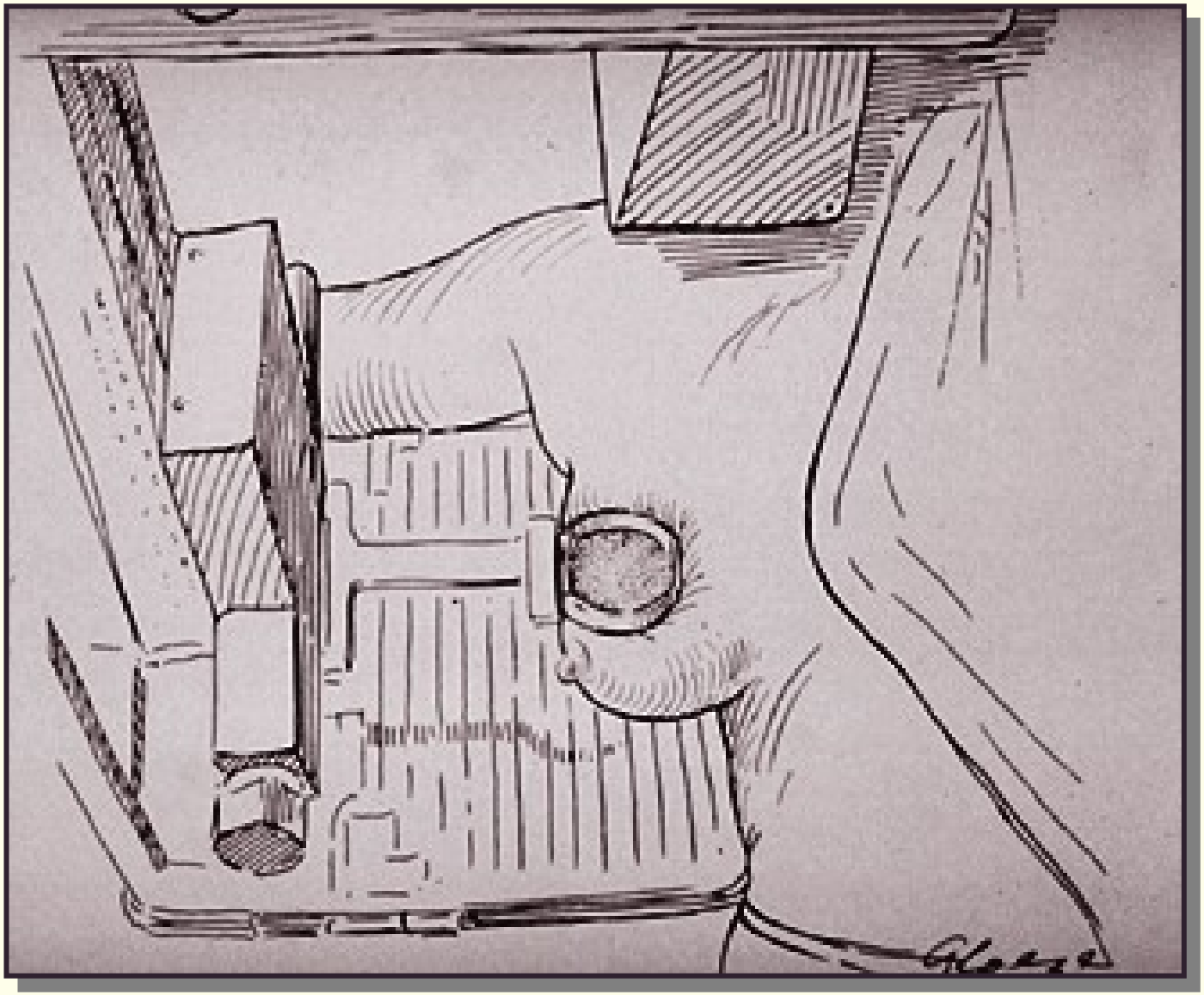


Diagnostic Mammography

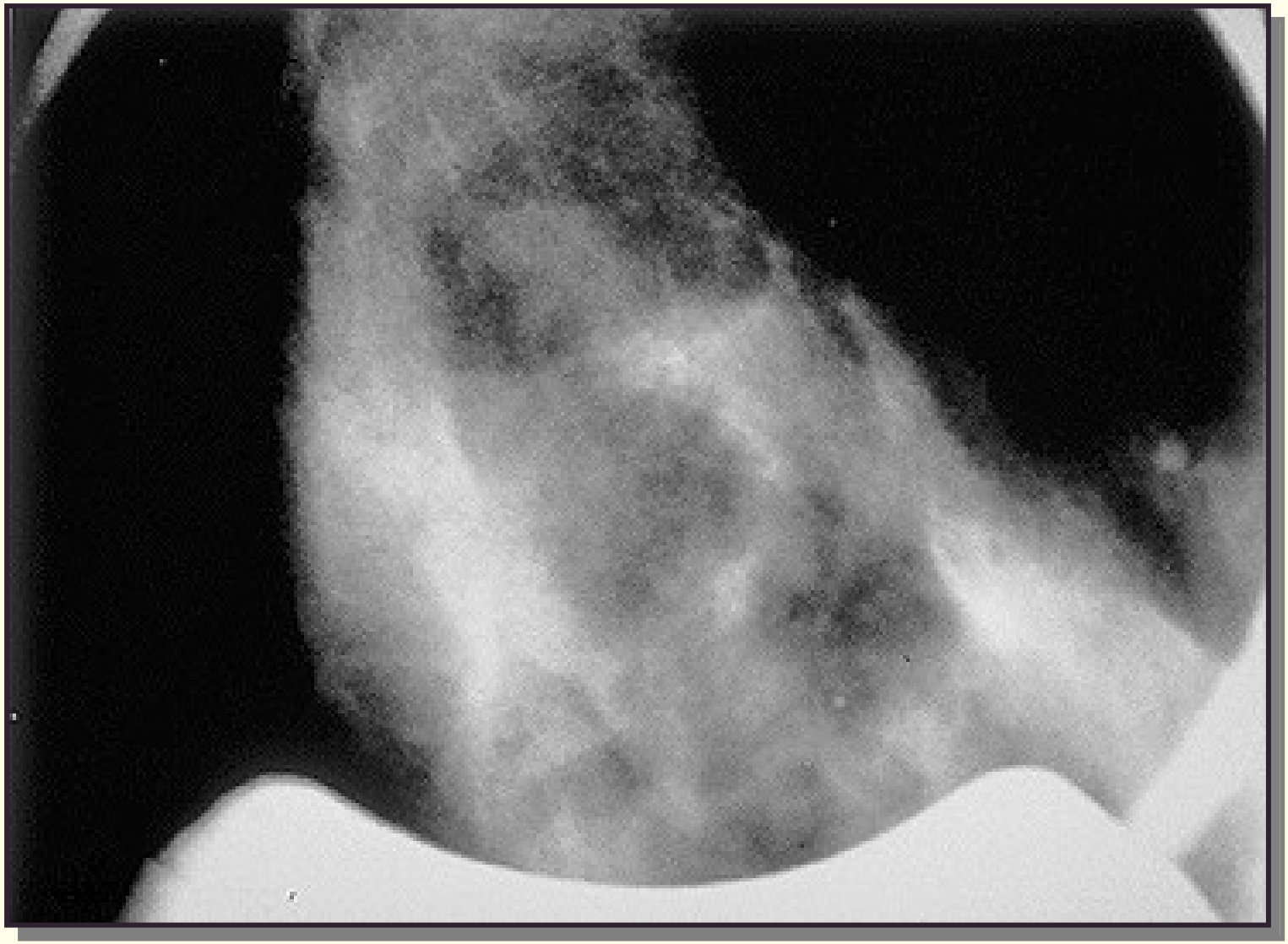
- Evaluates clinical and screen detected abnormalities
- Utilizes a variety of diagnostic studies
- Requires onsite radiologist

Common “Diagnostic” Views

- Cone-down compression
- Magnification



Density



No persistence of density

Adjunctive Procedures in Diagnostic Mammography

- Special Mammographic views
- **Ultrasound**
- MRI
- **Core needle biopsy**
- Galactography
- **Fine needle aspiration**

Appropriate use of Breast Ultrasound

- Characterize clinical or mammographic masses
- Focal pain or tenderness in a mammographically dense breast
- Abscess evaluation
- Implant rupture evaluation
- Adjunctive screening for high risk women with dense breasts?

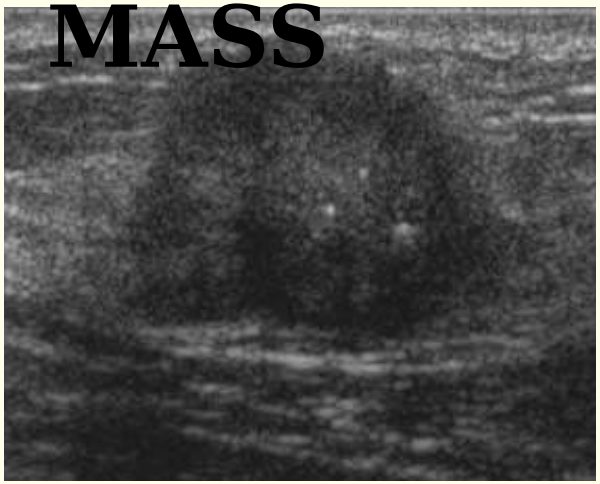
Inappropriate use of Breast Ultrasound

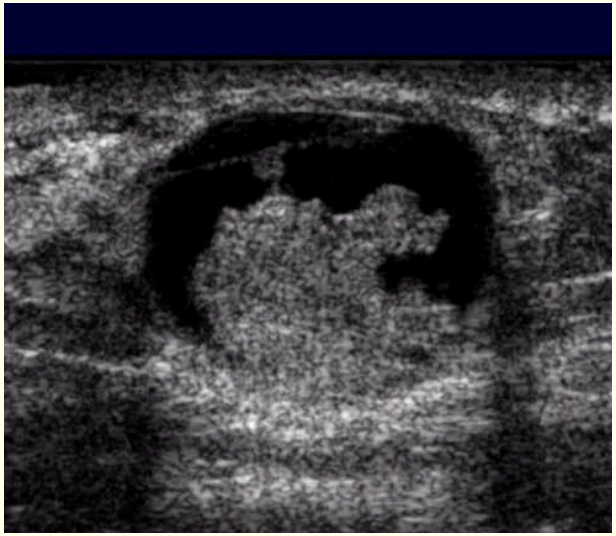
- Bilateral scanning for breast cancer
- Evaluation of bilateral diffuse breast pain
- Evaluation of bilateral non-bloody discharge
- Evaluation of bilateral “lumpiness”
- Evaluation of breast asymmetry

Ultrasound as a Primary Imaging Modality

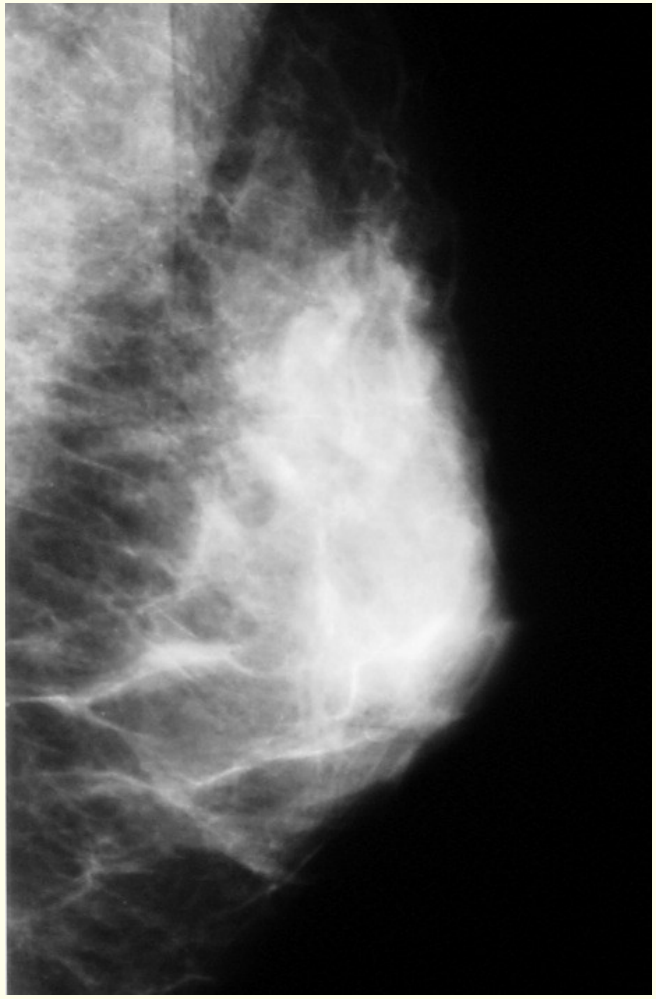
- <35 yrs with a palpable mass
- Palpable mass in a pregnant patient
- New palpable mass within 6 months of a negative mammogram

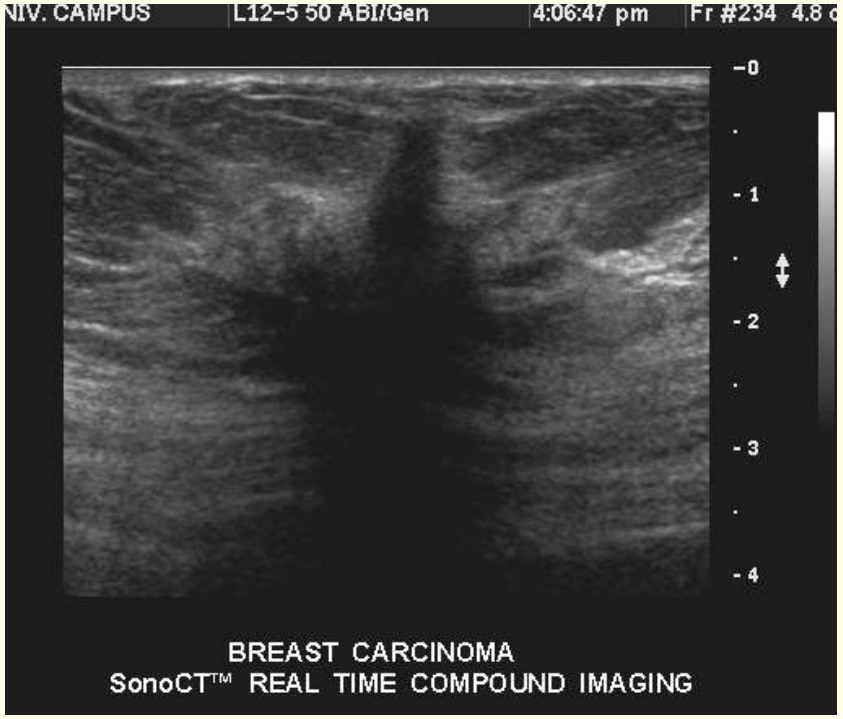
ULTRASOUND DISTINCTION OF CYSTIC VS SOLID BREAST MASS





MAMMOGRAPHY AND ULTRASOUND ARE COMPLIMENTARY PROCEDURES





Mammography Quality Standards Act MQSA 1992

- Quality Standards enforced by FDA
- All inclusive act covering physicians, technologists,physicists,equipment
- Standardized reporting
- Pt notification of results
- Referral process for self referred pts
- Maintenance and transfer of films
- Medical Audit

BIRADS Categories

Category 0: Need additional imaging

Category 1: Negative

Category 2: Benign finding

Category 3: Probably benign – short interval follow-up suggested

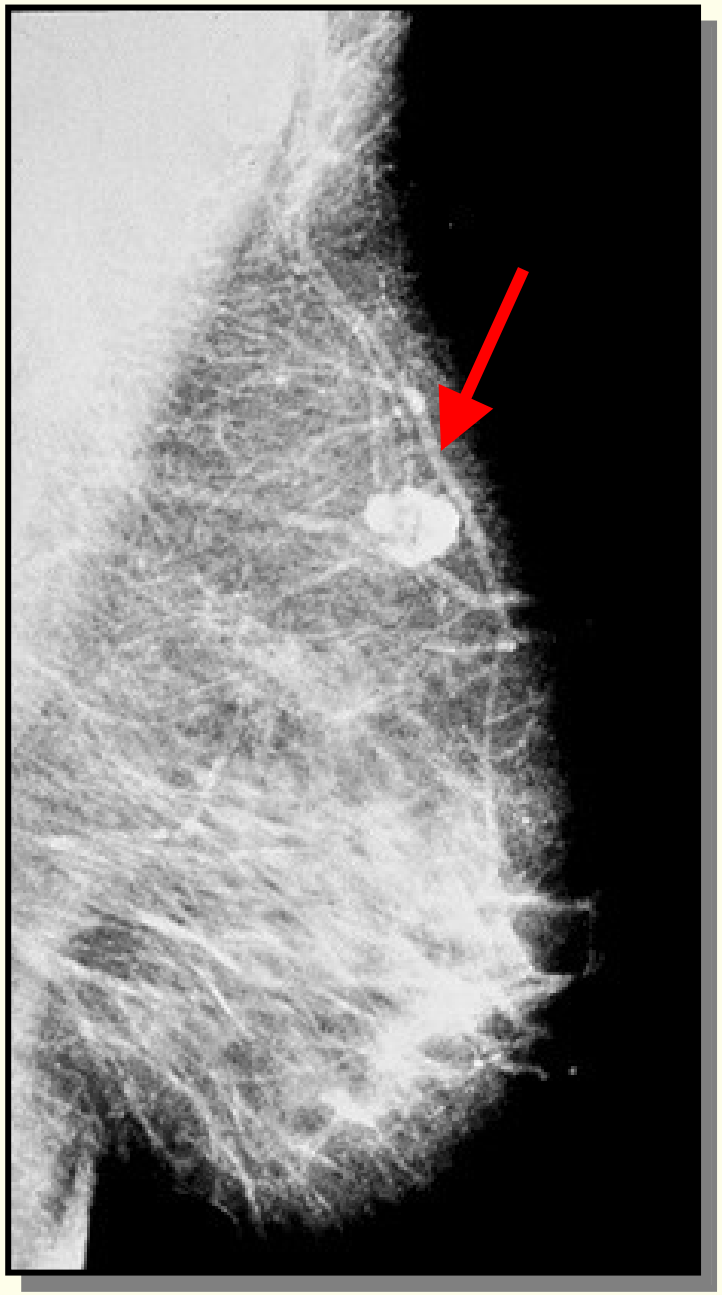
Category 4: Suspicious abnormality - biopsy should be considered

Category 5: Highly suggestive of malignancy - appropriate action should be taken

Category 6: Known malignancy

Common Mammographic Abnormalities

- **Intramammary Lymph Node**
- Smooth-Walled Mass
- Scattered Microcalcifications
- Mass with Irregular Borders
- Clustered Microcalcifications
- Spiculated Density



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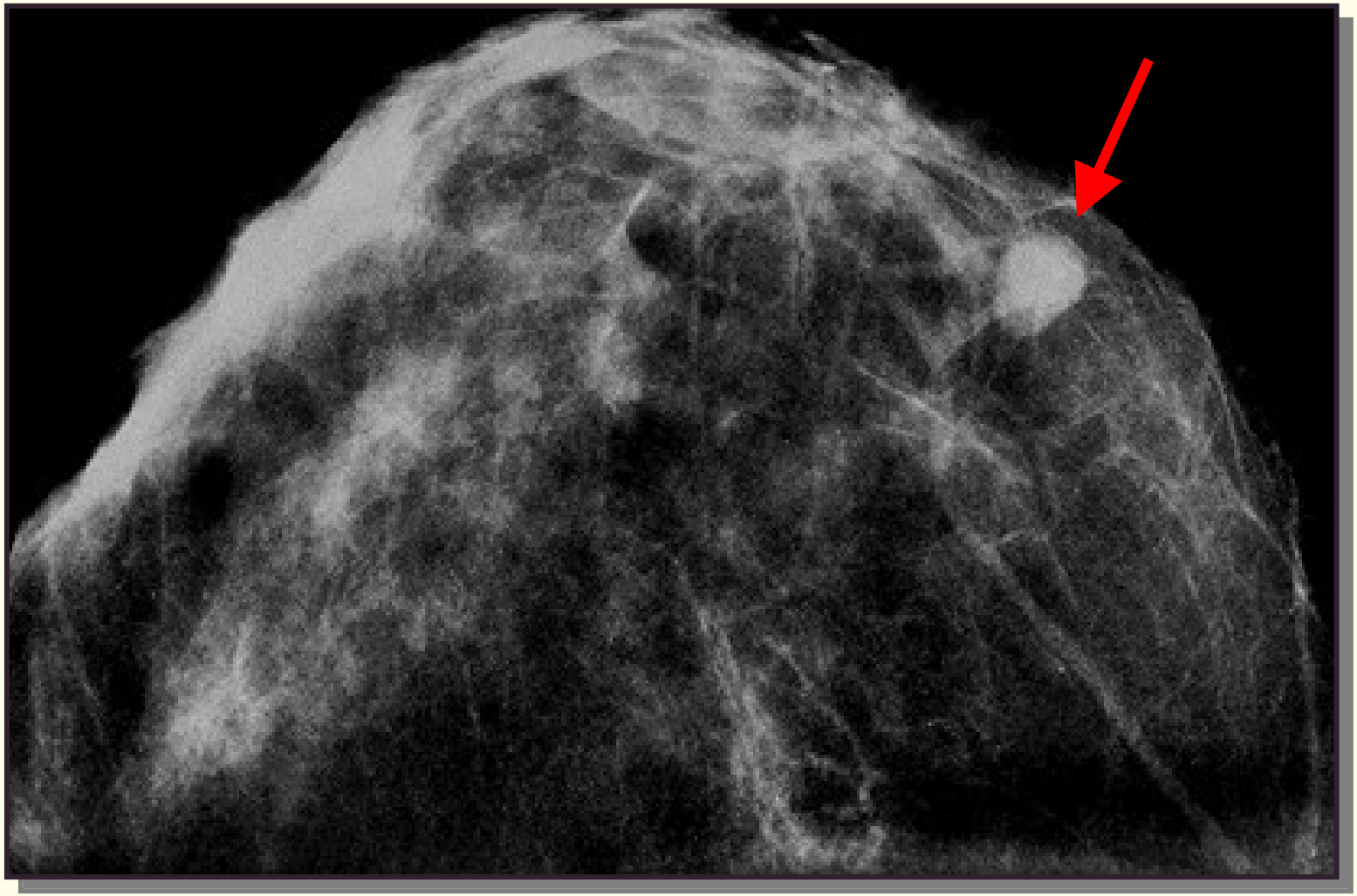

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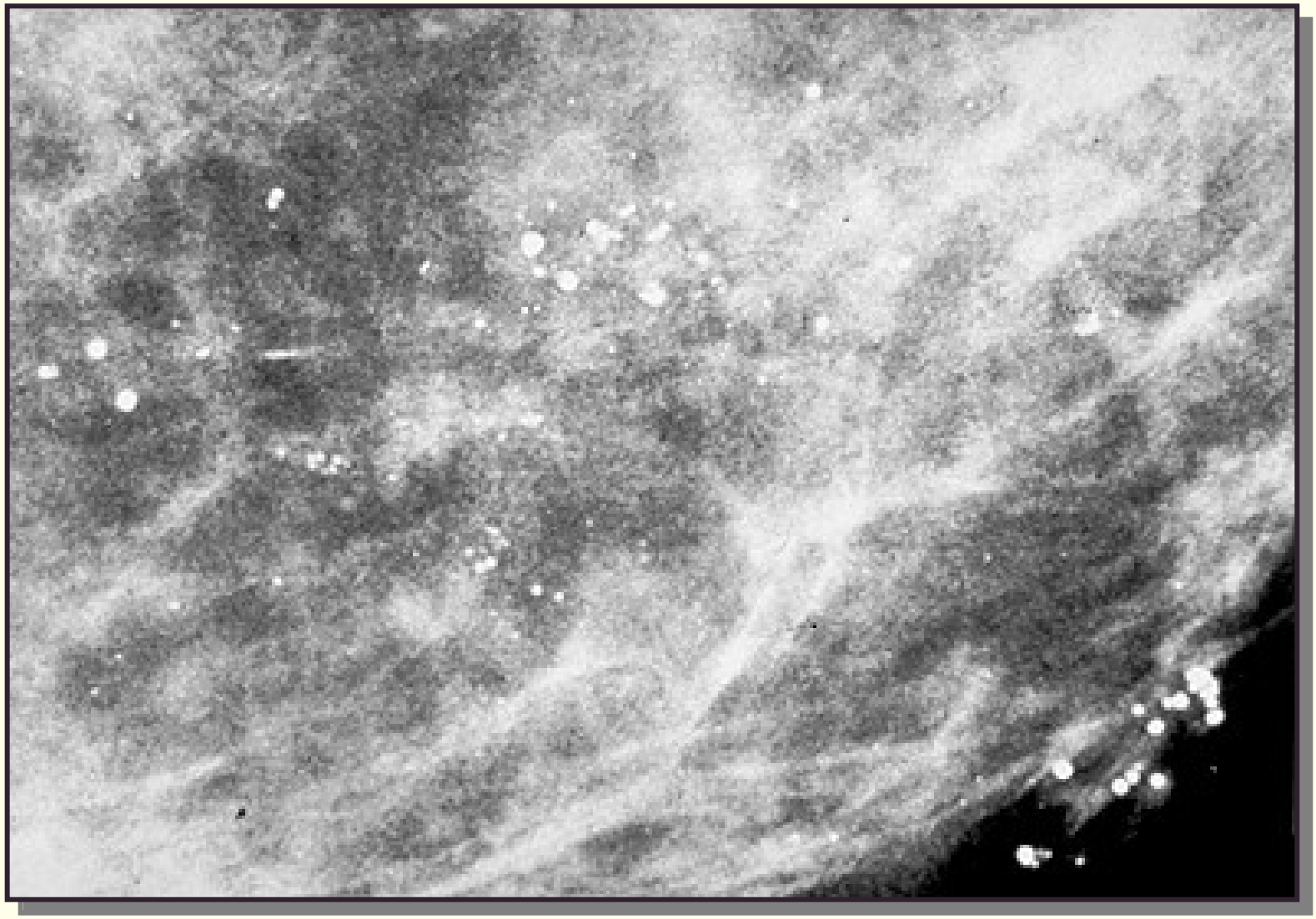

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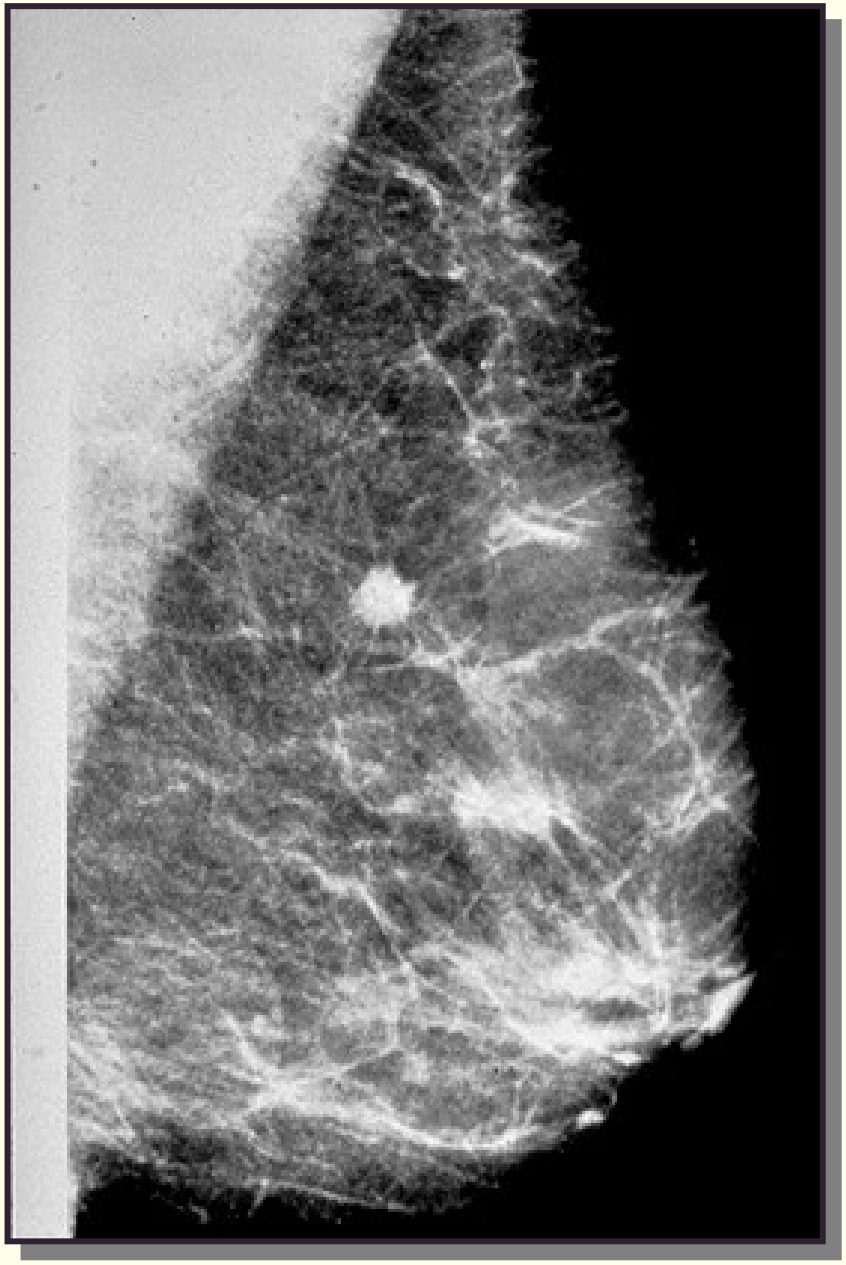

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- **Clustered Microcalcifications (DCI**
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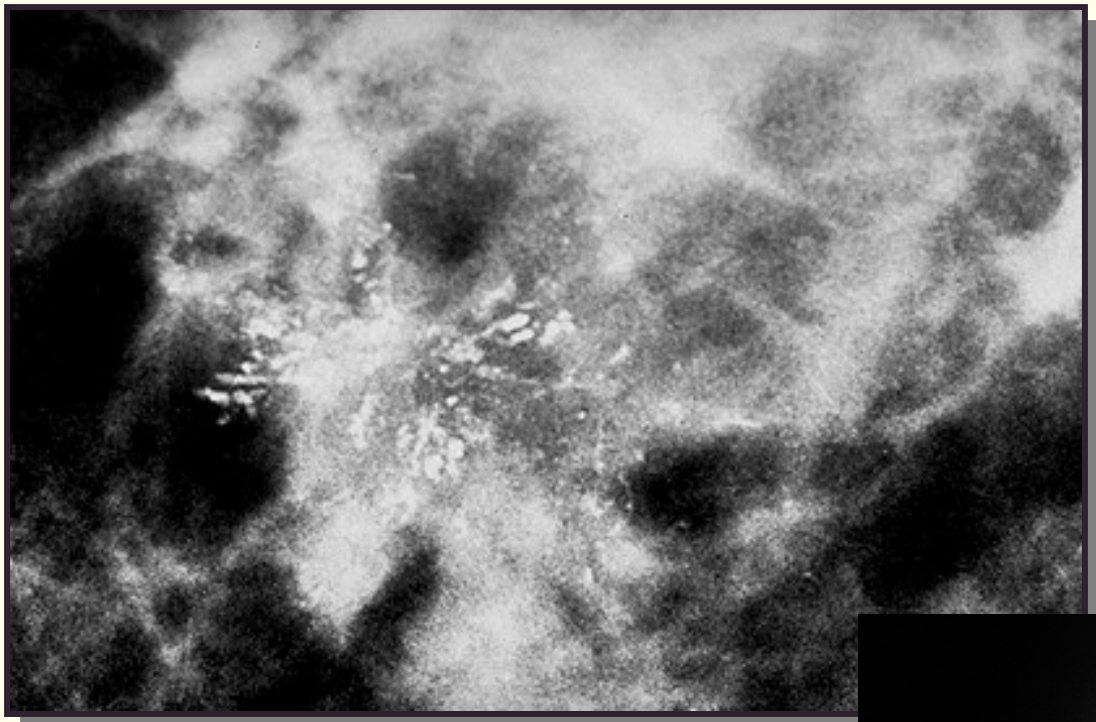

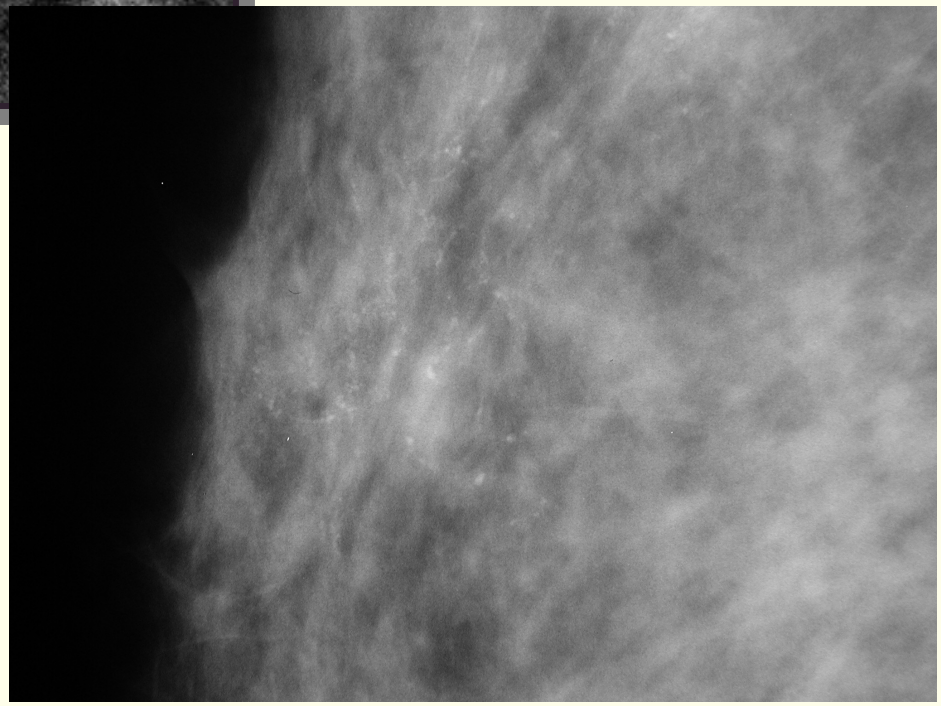

Common Mammographic Abnormalities

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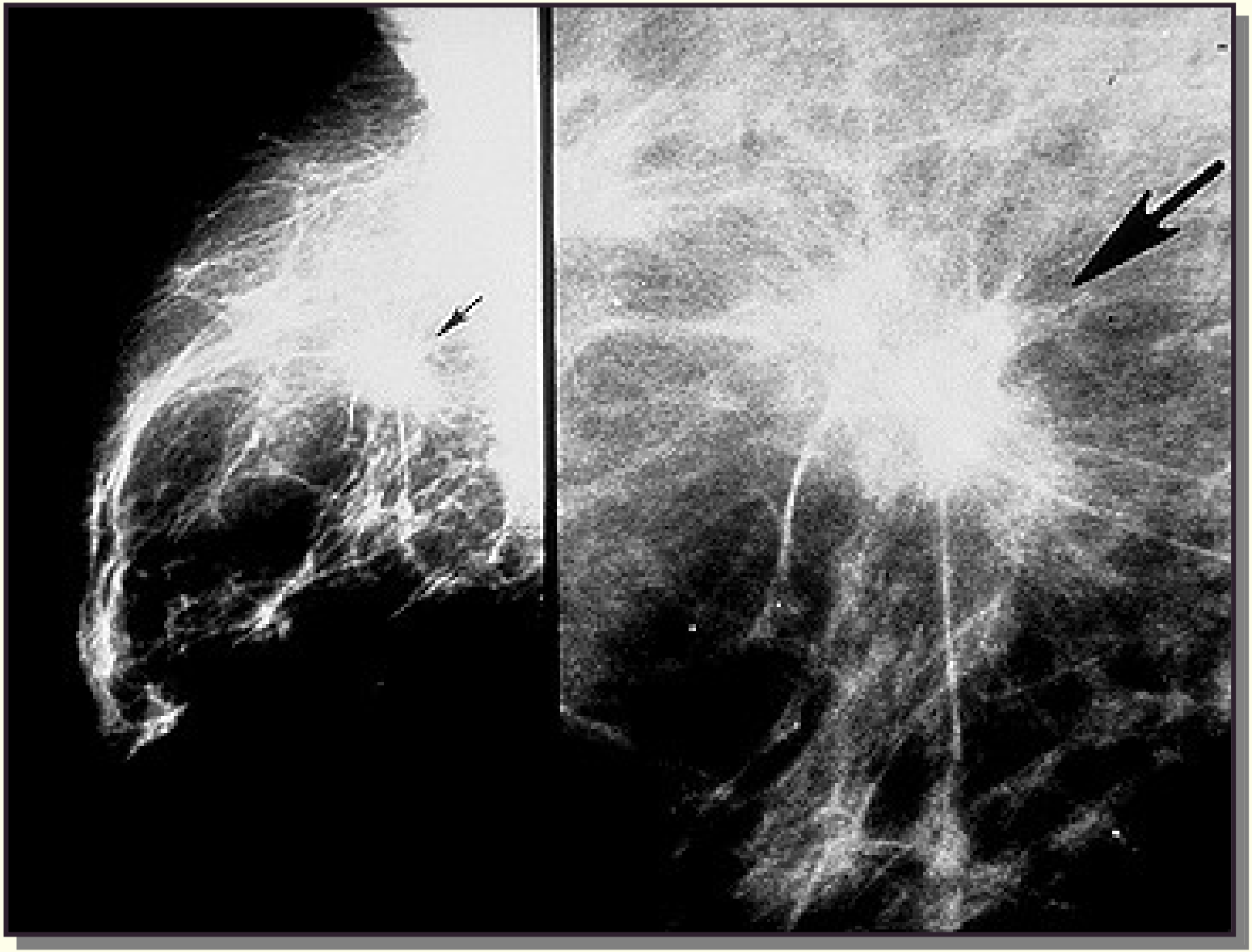
- Clustered Microcalcifications
- **Spiculated Density – Inv Cancer**



Mammographic Abnormality

If solid nodule and BI-RADS III:

- Mammographic follow up
  - Repeat in 6 months
  - Annual for 3 years if not receiving already

Mammographic Abnormality

Solid nodule or atypical cyst and BI-RADS IV:

- FNA
- Image guided biopsy
  - Ultrasound
  - Stereotactic

Image Guided Biopsy

- Fine Needle Aspiration (FNA)
- Core Biopsy

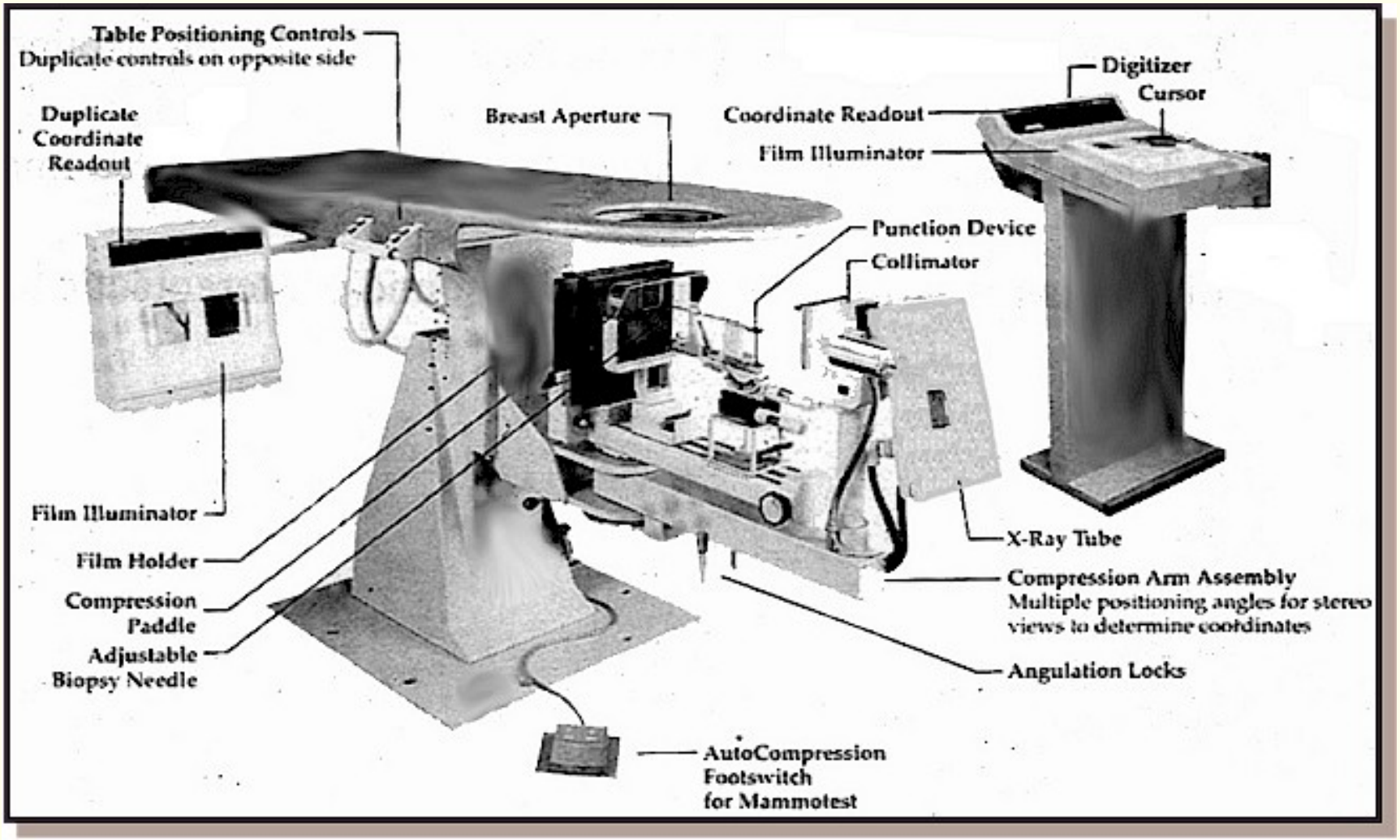
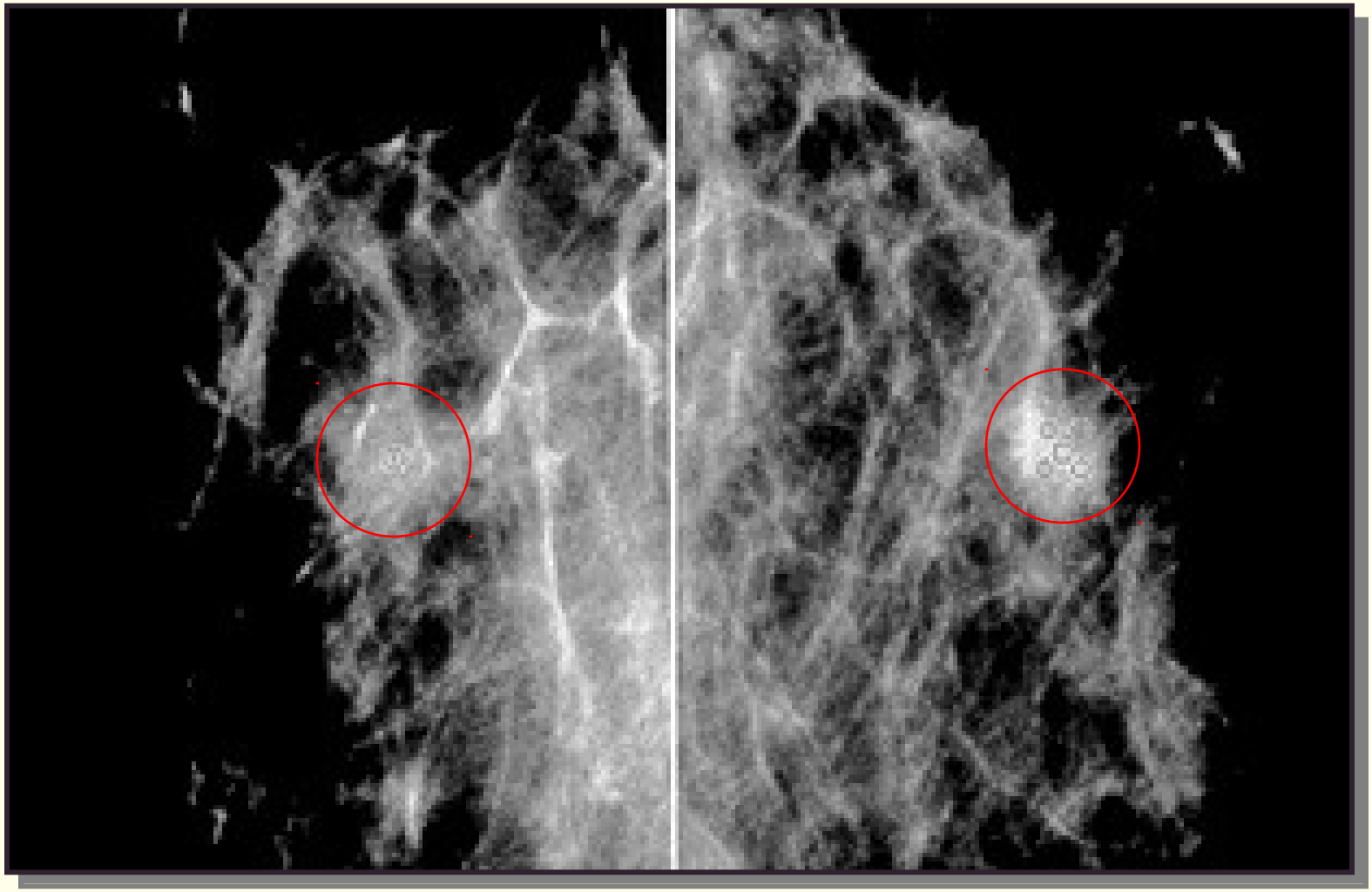


Table Positioning Controls
Duplicate controls on opposite side
Duplicate Coordinate Readout
Breast Aperture
Coordinate Readout
Digitizer
Cursor
Film Illuminator
Punction Device
Collimator
Film Illuminator
Film Holder
Compression Paddle
Adjustable Biopsy Needle
X-Ray Tube
Compression Arm Assembly
Multiple positioning angles for stereo views to determine coordinates
Angulation Locks
AutoCompression Footswitch for Mammotest

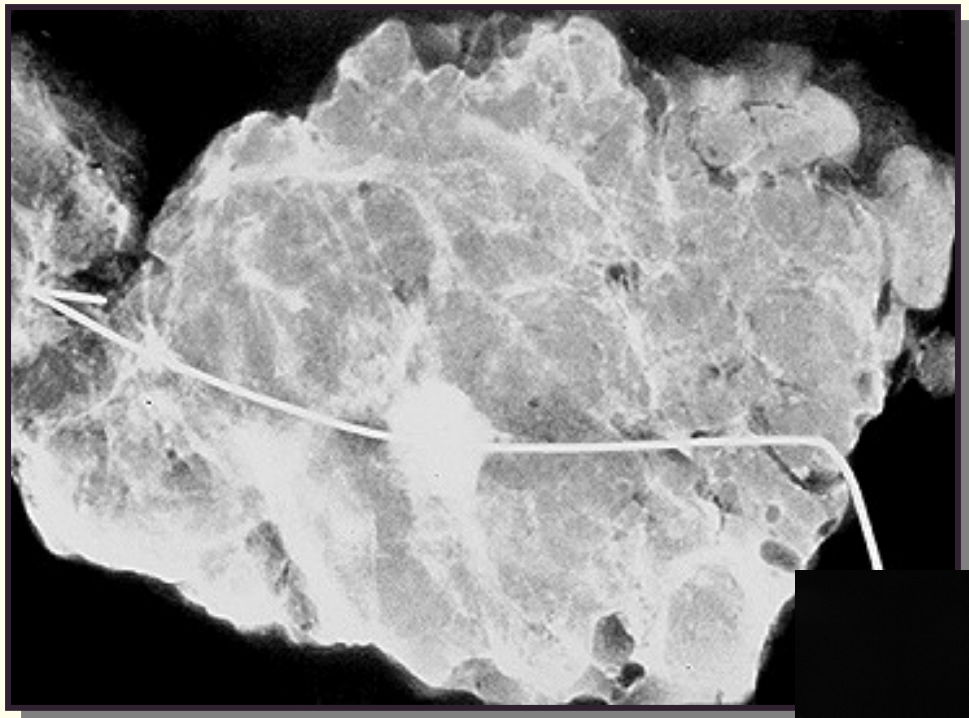


Needle Localization Prior to Surgery

- **Medial-Lateral View**
- **Abnormalities Present on Both Vie**
- **Needle Placed/Positioned**
- **Mammographic Confirmation**
- **Wire Placed**

Surgery

- **Incision Placed at Wire**
- **Wire Followed to Abnormality**
- **Specimen Marked for Orientation**
- **Specimen Mammogram Performe**



Common Reasons Cited By Women For Not Having A Mammogram

- “My doctor didn”t tell me that I needed one
- Lack of awareness about mammography
- Cost and/or lack of health insurance
- Lack of access to mammography facilities
- Misconception that without symptoms there is no need for screening

When to stop Screening?

- No hard data
- As long as women would benefit from early detection screening should continue

Questions?